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Professor Lloyd and Major Sabine, relating to the preparation for the undertaking.

Professor Bache further stated, that on submitting the circular addressed to him by the Foreign Secretary of the Royal Society, with extracts from the letters before referred to, and other information as to the nature and importance of the results to be obtained by this combined system of magnetic observations, to the Building Committee of the Girard College, through their Architect, they had, with creditable liberality, given orders for the erection of an observatory suited to the observations contemplated, and to the instruments already in the possession of the Trustees of the College.

Professor Bache submitted the plans of the observatory, drawn by Thos. U. Walter, Esq. Architect.

Mr. Justice made some remarks in continuation of those offered at the last meeting of the Society, in support of his opinion of a gyratory motion in the tornado of the 31st July, the destructive effects of which were felt about seventeen miles north of Philadelphia.

Stated Meeting, October 4.

Present, twenty-one members.

Mr. Du PONCEAU, President, in the Chair.

The following donations were received:—

FOR THE LIBRARY.

Mémoires de l'Académie Royale des Sciences Morales et Politiques de l'Institut de France. Vol. II. Second series. Paris, 1839.—
From the Academy.

Institut Royal de France. Séance Publique Annuelle des Cinq Académies, 1839.—*From Mr. D. B. Warden.*

Institut Royal de France. Séance Publique Annuelle de l'Académie des Sciences Morales et Politiques, 1839. Paris, 1839.—*From the same.*

Recueil de Voyages et de Mémoires publié par la Société de Géographie. Vol. IV. Paris, 1839.—*From the Society.*

- Transactions of the Society for the Encouragement of Arts, Manufactures, and Commerce, for the Session 1831-32. Vol. XLIX.
 Part I. London, 1832.—*From the Society.*
- The Transactions of the Linnean Society of London. Vol. XVII.
 Part IV., and Vol. XVIII., part II. London, 1837 and 1839.—
From the Society.
- List of the Linnean Society of London, 1839. London, 1839.—*From the same.*
- Transactions of the Horticultural Society of London. Second series.
 Vol. II. Part III. and IV. London.—*From the Society.*
- Proceedings of the Horticultural Society of London. Nos. 1 to 6 inclusive. London 1838 and 1839.—*From the same.*
- Proceedings of the Committee of Commerce and Agriculture of the Royal Asiatic Society of Great Britain and Ireland. London, 1839.—*From the Society.*
- Proceedings of the Zoological Society of London. Part VI. London, 1838.—*From the Society.*
- Reports of the Council and Auditors of the Zoological Society of London, 1839. London, 1839.—*From the same.*
- Histoire du Régiment de Champagne, par Roux de Rochelle. Paris, 1839.—*From the Author.*
- Elements of Geology, by Charles Lyell, F.R.S. First American from the first London edition. Philadelphia, 1839.—*From James Kay, Jr. and Brother.*
- A Bengalee Almanac.—*From the Rev. J. P. Engles.*
- Maps to illustrate the Easy Introduction to Astronomy in Hindustání.
From the same.
- Asselements et Culture des Plantes de l'Alsace, par J. N. Schwerz. Traduit de l'Allemand et annoté par Victor Rendu. Paris, 1839.
From Mr. D. B. Warden.
- L'Art de vérifier les Dates, depuis l'Année 1770, jusqu'a nos jours. Vol. XVII. (Vol. IX. of the series relating to America.) Paris, 1837.—*From the same.*
- Fragments sur l'Histoire Politique et Littéraire de l'ancienne République de Raguse et sur la Langue Slave. Par le Comte Duc de Sorgo. Paris, 1839.—*From the same.*
- Chemical Diagrams, or Concise Views of many interesting Changes produced by Chemical Affinity. By Jacob Green, M.D. Philadelphia, 1837.—*From the Author.*

Remarks on the Trilobite, and Description of a New Trilobite. By Jacob Green, M.D. New Haven, 1839.—*From the same.*

London Catalogues of Books for 1839. Two Vols.—*From Mr. Edward D. Ingraham.*

Popular Lectures on Geology, by R. C. Von Leonhard. Translated by the Rev. J. G. Morris, A.M., and edited by Professor F. Hall, M.D. Baltimore, 1839.—*From the Editor.*

The American Almanac and Repository of Useful Knowledge, for the year 1840. Boston, 1839.—*From the Editor.*

FOR THE CABINET.

A specimen of Iron Ore from the Island of Cuba.—*From Mr. R. C. Taylor.*

The Committee, consisting of Dr. Dunglison, Mr. Kane, and Mr. Lea, to whom were referred a letter of the Rev. Charles Gutzlaff to John Vaughan, Esq. dated Macao, January 2, 1839, and the letter of Peter S. Du Ponceau, Esq. to the same gentleman, dated Philadelphia, September 20, 1839, made their report, which was read and accepted.

The communication of Mr. Gutzlaff was suggested by the dissertation of Mr. Du Ponceau, “On the nature and character of the Chinese system of writing.” As the results of his reflection and observation, Mr. Gutzlaff affirms, that China was the great centre of civilization, whence it diverged to all the countries of Eastern and Southern Asia; the colonists from China driving the autochthonous tribes into the mountains, and incorporating the country itself, including Tunkin and Annam, with the central kingdom. A constant influx of Chinese also took place into Korea, but the emigration to Japan and the Loo Choo Islands was less extensive.

Chinese words, and the Chinese art of writing, were thus introduced into these countries: Chinese books became their literature; and, like the Latin in the middle ages, the Chinese was the language of the learned. Yet all the nations that have adopted the Chinese mode of writing, speak a language more or less distinct from the written idiom. The different nations, too, who employ the Chinese characters, call them differently, using their own language to designate them, and they, as well as the Chinese themselves, have to learn the meaning of the characters from teachers, who explain them in the dialect spoken amongst the people. The dialects spoken by the different nations,

who use the Chinese character, are very distinct from the language of China proper. The Koreans and Japanese, whilst they transact all important business in the Chinese character, have a syllabary with which they write their own language. The Cochin Chinese occasionally use the Chinese in a contracted form, without any reference to its meaning, to express sound, but they have no syllabary.

It is not strictly true that sound is not inherent in the Chinese character. A majority of the signs are not pronounced by the Chinese at random, nor do the nations abandon all analogy in reading them, although they vary much. Mr. Gutzlaff has been struck with the ease with which communication may be held with the Cochin Chinese, Japanese and Koreans, by means of the Chinese character, even without comprehending a word of their idiom. This, he says, does not refer to the learned classes only, but to the very fishermen and peasants, with some exceptions only. In the Loo Choo Islands, men of distinction talk Chinese with great fluency, but the mass of the people speak a dialect of the Japanese, and employ the Chinese character as well as the Japanese syllabary. Mr. Gutzlaff considers it certain, that the nations who have adopted the Chinese character, attach the same meaning to it as the natives from whom it was originally derived, and that its construction is likewise retained with scarcely any alterations.

The communication of Mr. Du Ponceau is a rejoinder to that of Mr. Gutzlaff. Mr. Du Ponceau repeatedly combats the notion entertained by some, that the superiority of the Chinese alphabet is such, that it forms a kind of pasigraphic system, which may be adapted to every language. He admits, to a certain extent, what he was disposed at one time to doubt, that the Chinese characters do actually serve as a means of communication between different nations, who can neither speak nor understand each other's oral language, and he investigates, at some length, the causes by which this effect is induced; but he expresses himself at a loss to understand how the fishermen and peasants of Japan, Korea and Cochin China, "with only some exceptions," can be readily communicated with by means of Chinese characters, even by a person who does not understand a single word of their spoken language. The remark of Mr. Gutzlaff, he conceives, cannot be meant to imply that all, or nearly all the fishermen and peasants of the countries referred to, can read and write the Chinese; for, on the authority of Mr. Medhurst, there are villages, even on the coast of China, where few, if any, of the inhabitants can either read or write. If, however, the assertion of Mr. Gutzlaff be assumed to

be rigorously accurate, it will have to be explained by the circumstance, that as the Chinese is esteemed a universal medium of communication between the people referred to, it is more extensively taught amongst them than even amongst the Chinese themselves.

Mr. Du Ponceau enters, at some length, into the nature of the four languages, or classes of languages which are embraced in the communication of Mr. Gutzlaff. 1. Of the various dialects of the Chinese. 2. Of the Annamitic languages. 3. Of the languages of Japan and the Loochoo Islands; and 4. Of the Korean; the two first of which are monosyllabic, the two last polysyllabic; and from all the facts and reflections, he concludes, that the circumstance of the Chinese characters being understood so extensively amongst these people, is not owing to any thing inherent in the Chinese characters, in their shape or greater perspicuity, but to their connexion with the languages from which they were formed, and to the mode in which they have been adapted to them. The vernacular languages of Japan, the Loochoo Islands, and Korea, are so different from the Chinese, that it was found impossible to apply to them the Chinese system of writing; consequently, when the people of these countries read the Chinese characters, they do not read them in their native language, but in the Chinese, which they have acquired, but pronounce differently from the Chinese themselves. This is not the case with the people of Tunkin and Cochin China—the Annamites; their language or languages being formed on the model of that of China, with some variations, which they learn, in their schools, to correct, and to employ the proper characters as a superior orthography, by which they are enabled to read the Chinese as well as their own language.

The Committee recommended that the interesting communications of Mr. Gutzlaff and Mr. Du Ponceau, tending as they do, to elucidate a contested topic of Oriental Philology, be published in the transactions of the Society.

Dr. Hare made a verbal communication on the subject of tornadoes, and on his electrical theory of their formation, supporting his views by reading an extract from a Memoir by M. Peltier, describing a destructive tornado which occurred near Paris, in June last.

Dr. Hare stated that agreeably to a publication in the *Journal des Débats* for the 19th of July, some losers by this tornado having effected insurance against damage from thunder gusts, applied to the insurers

for indemnity, which was refused, upon the plea that a tornado was not a thunder gust (orage). The question having been submitted to Arago, it was by him referred to Peltier.

Peltier, after due investigation, came to the conclusion that a tornado is a modification of the thunder gust, in which, in lieu of passing in the form of lightning, electricity passes through a cloud, acting as a conductor between the terrestrial surface and the sky. It will be perceived that this view of the subject differs but little from that which, in a memoir in the transactions of the Society, had been presented by Dr. Hare, in the following language:—"A tornado is the effect of an electrified blast of air, superseding the more usual means of discharge between the earth and clouds, in the sparks and flashes which we call lightning. I conceive that the effect of such a current would be to counteract, within its sphere, the pressure of the atmosphere, and thus to enable this fluid, in obedience to its elasticity, to rush into the rarer medium above."

Dr. Hare went on to say, that the only difference arises from the omission of the Parisian philosopher to call in the electricity of the air in aid of the electrical forces, and his assigning to a cloud the agency which Dr. Hare had attributed to a vertical blast of electrified air, mingled with every species of moveable matter coming within the grasp of the meteor; and that it would seem, from a subsequent communication made by Peltier to the Institute, that he had so entirely misapprehended Dr. Hare's theory, as to ascribe to it deficiencies for which it was not amenable, but which had existed in his own explanation, as stated in his report.

The fault of Dr. Hare's explanation was, according to him, "*en ne tenant pas compte des forces nouvelles que la première, (that is to say, the electric attraction,) acquiert par le mouvement gyrotoire qui accompagne souvent la colonne de nuages et d'eau qu'on appelle trombe.*"

As the most appropriate refutation of this mistatement, Dr. Hare stated that he would quote a paragraph from his Memoir.

"When once a vertical current is established, and a vortex produced, I conceive that it may continue after the exciting cause may have ceased.

"The effect of a vortex in protecting a space about which it is formed, from the pressure of the fluid in which it has been induced, must be familiar to every observer. In fact, Franklin ascribed the water spout to a whirlwind.

"His hypothesis was, I conceive, unsatisfactory, because it did not assign any cause for the concentration of the wind, or for the hiatus presumed to be the cause. This deficiency is supplied, if my suggestions be correct."

On reading this passage, after previously hearing or reading the allegation above quoted, that Dr. Hare's hypothesis was defective in not appealing to a gyratory movement, it was presumed that it would be perfectly evident to every one, that, from ignorance of English, or inattention, Mr. Peltier's statement was the reverse of the reality.

In proof of a gyratory force having been exercised during the New Brunswick tornado, Dr. Hare referred to his having, in his Memoir, cited the case of a chimney, of which the upper portion had been so twisted upon the lower portion, as to have its corners projecting over the sides of the latter; but he had now taken a different view of that fact, which had since struck him as being of much higher importance than he had formerly considered it.

During an examination of the track of the tornado which lately ravaged the suburbs of New Haven, Dr. Hare had been led to infer that the electrical discharge is concentrated upon particular bodies, according to their character, or the conducting nature of the soil; so that the vertical force arising from electrical reaction, and the elasticity of the air, acts upon them with peculiar force. Hence, while some trees were borne aloft, others, which were situated very near them, on either side, remained rooted in the soil. In two instances at New Haven, wagons were especially the victims of the electro-aërial conflict. In the case of one of these, the axletree was broken, and while one wheel was carried into an adjoining field, the other was driven with so much force against the weather-boarding of a barn, as to leave both a mark of the projecting hub, and of the greater portion of the periphery. The plates of the elliptical springs were separated from each other. During the tornado at New Brunswick, the injury done to some wagons in the shop of a coach-maker, appeared, at the time, inexplicable. It was now inferred, that the four iron wheel tires, caused, by their immense conducting power, a confluence of the electric fluid, producing a transient explosive rarefaction, and a subsequent afflux of air with a local gyration of extreme violence.

It may be reasonably surmised, that the excessive injury done to trees results, not from the general whirl, but from a local gyration to

which they are subjected, in consequence of the multiplicity of points which their twigs and leaves furnish for the emission of the electrical fluid. The fact that the leaves of trees thus injured, appear afterwards as if they had been partially scorched, seems to countenance this idea. The twisting of the chimney at New Brunswick, as above mentioned, seems difficult to explain, agreeably to the idea of a general whirl throughout the whole area of the tornado track. The chances are infinitely against any chimney having its axis to coincide with that of a great whirlwind, forming a tornado; and it must be evident, that in any other position, it could only be subjected to the rotary force on one side at a time. But if this were adequate to twist the upper upon the residual portion, the former would necessarily be overthrown. Evidently, it could not be left, as was the chimney which called forth these remarks.

During the tornado at New Haven, chimneys seemed to be especially affected. One, after being lifted, was allowed to fall upon a portion of the roof of the house to which it belonged, at a distance from its previous situation too great to have been reached, had it been merely overthrown. In the case of a church which was demolished, a portion of the chimney was carried to a distance greater than it could have reached without being lifted by a vertical force.

It appeared quite consistent that chimneys should be particularly assailed, since that rarefaction, which, by operating upon the roofs of houses, carries them away, must previously cause a great rush of air through the chimney flues. But this concentration of the air must tend to facilitate the "convective"^{*} discharge in that direction; since an electrical discharge by a blast of air, is always promoted by any mechanical peculiarities favouring an aërial current, or jet.

That during a recent tornado in France, articles were carried from the inside of a locked chamber to a distance without, when no opening existed besides that afforded by a chimney, seemed to justify the suggestion that there must be a great rush of air through such openings.[†]

* A "convective" discharge, or a discharge by "convection," in the very appropriate language of the celebrated Faraday, is a process by which electricity is conveyed by the transfer of electrified bodies from one excited surface to another in an opposite state. This is conceived to be a good definition of the discharge which produces a tornado.

Dr. Hare did not conceive it proper to trespass upon the time of the Society, to make any allusion to that part of his Memoir, in which the three enormous concentric spaces occupied by the earth, the denser non-conducting atmosphere, and the rare conducting medium beyond the denser atmosphere,

Dr. Hare also made some remarks on the aurora which occurred on the third of September, in which he suggested that the electric fluid, producing the phenomena then observed, might have been derived from remote parts of space.

Stated Meeting, October 18.

Present, thirty-one members.

Mr. DU PONCEAU, President, in the Chair.

The following donations were received:—

FOR THE LIBRARY.

Nova Acta Regiæ Societatis Scientiarum Upsaliensis. Vol. X. Uppsala, 1832.—*From the Society.*

Mémoires publiés par la Société Royale et Centrale d'Agriculture. Année, 1838. Paris, 1838.—*From Mr. D. B. Warden.*

Extraits des Procès-Verbaux de la Société Philomathique de Paris, 1836, 1837, 1838.—*From the same.*

Académie Royale des Sciences de Turin. Classe des Sciences Physique et Mathématiques. Question de Physique, pour l'année 1841. Turin, 1839.—*From the Academy.*

Triennial Catalogue of the Theological Seminary, Andover, Massachusetts. Andover, 1839.—*From the Rev. Oliver A. Taylor.*

Report on the Magnetic Isoclinal and Isodynamic Lines in the British Islands. By Major Edward Sabine, R. A. F. R. S. London, 1839.—*From the Author.*

Allgemeines Bibliographisches Lexikon. Von Friedrich Adolf Ebert. Leipsic, 1821.—*From Mr. John Penington.*

are represented as competent to perform a most important part in the production of electrical storms; nor did he feel at liberty to make any remarks in support of an opinion which he had recently formed, that a hurricane is a gigantic tornado. Neither had he time to cite the evidence furnished by Reid's work upon storms, in favour of a local force or gyration, like that of which he had seen proofs, arising from the New Haven tornado.